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constructing [a] color maps [map] describing relationships [a relationship]
between the different combinations of source and destination color imaging systems
using the color conversions and user preferences;

storing the color maps; and

when a user requests a transformation for a selected combination of the source and
destination color imaging systems and selected user preferences:

determining whether one of the color maps corresponds to the selected
combination and the selected user preferences,

if so, retrieving the corresponding color map, and

if not, constructing a new color map for the selected combination and
selected user preferences.

2. (Amended) A [color mapping] method, according to claim 1, further
comprising recursively reducing differences between black channel information.

3. (Amended) A [color mapping] method, according to claim 1, further
comprising using an error function for calculating the color conversions.

4. (Amended) A [color mapping] method, according to claim 1, further
comprising configuring at least one of the profiles to account for certain perceptual
effects on color appearance.

5. (Amended) A [color mapping] method, according to claim 1, wherein the
color map comprises at least one of the following: a lookup table, and an equation.

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7. (Amended) A method for [For use in] transforming colors between source
and destination color imaging systems, a [color mapping] method comprising:

using profiles that characterize the color imaging systems to generate device-
independent color values for the source color imaging system, the device-independent
color values having a same dimensionality as the source color imaging system;

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using the profiles to perform a color conversion for converting the device-independent color values to device-dependent values of the destination color imaging system; [and]

using the color conversion and user preferences to define a color map for transforming colors between the color imaging systems;

applying the color map to transform colors between the color imaging systems in the event the color map was defined based on existing user preferences; and

in the event the color map was not defined based on the existing user preferences, using the color conversion and the existing user preferences to redefine the color map, and applying the redefined color map to transform colors between the color imaging systems.

7.8. (Amended) A [color mapping] method, according to claim 7⁶, wherein the color conversion is performed at least twice.

8.9. (Amended) A [color mapping] method, according to claim 7⁶, further comprising:

using the color conversion to evaluate its accuracy at least once; and
revising the color conversion at least once to improve its accuracy.

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10. (Amended) For use in transforming colors between source and destination color imaging systems, a [color mapping] method comprising:

(a) using profiles characterizing the color imaging systems to generate device-independent color values for the source color imaging system, the device-independent color values having a same dimensionality as the source color imaging system;

(b) using the profiles to perform a color conversion for converting the device-independent color values to device-dependent values of the destination color imaging system;

(c) using the color conversion to improve the accuracy of the color conversion relative to a quality threshold;

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(d) returning to step (c) until the color conversion satisfies the quality threshold; [and]

(e) using the color conversion and user preferences to define a color map for transforming colors between the color imaging systems;

(f) using the color map to transform colors between the color imaging systems in the event the color map was defined based on existing user preferences; and

(g) in the event the color map was not defined based on the existing user preferences, using the color conversion and the existing user preferences to redefine the color map, and applying the redefined color map to transform colors between the color imaging systems.

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11. (Amended) For use in transforming colors between source and destination color imaging systems, a system [color mapping arrangement] comprising:

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means for using forward transformation profiles that characterize the source and destination color imaging systems to generate respective sets of device-independent color values for the source and destination color imaging systems;

means for calculating color conversions for different combinations of source and destination color imaging systems by recursively reducing differences between the corresponding sets of device-independent color values; [and]

means for constructing [a] color maps [map] describing relationships [a relationship] between the different combinations of source and destination color imaging systems using the color conversions and user preferences;

storing the color maps; and

when a user requests a transformation for a selected combination of the source and destination color imaging systems and selected user preferences;

determining whether one of the color maps corresponds to the selected combination and selected user preferences.

if so, retrieving the corresponding color map, and

if not, constructing a new color map for the selected combination and selected user preferences.

12. (Amended) For use in transforming colors between first and second color imaging systems respectively using first and second color coordinate systems, a [color mapping] method comprising:

- (a) generating first device-independent color coordinates as a function of color coordinates in the first color coordinate system;
- (b) estimating preliminary color coordinates in the second color coordinate system;
- (c) generating second device-independent color coordinates as a function of the preliminary color coordinates;
- (d) adjusting the preliminary color coordinates to reduce an error between the first and second device-independent color coordinates;
- (e) returning to step (a) until the error satisfies a quality threshold; [and]
- (f) constructing a color map describing a relationship between the first and second color imaging systems as a function of the adjusted color coordinates and user preferences;
- (g) using the color map to transform colors between the first and second color imaging systems in the event the color map was defined based on existing user preferences; and
- (h) in the event the color map was not defined based on the existing user preferences, using the color conversion and the existing user preferences to redefine the color map, and applying the redefined color map to transform colors between the first and second color imaging systems.

12 13. (Amended) A [color mapping] method, according to claim ¹¹12, further comprising using the color coordinates in the first color coordinate system to estimate the preliminary color coordinates.

Sub BH 14. (Amended) For use in transforming colors between color imaging systems, a system [color mapping arrangement] comprising:

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a computer arrangement[,] programmed to

use forward transformation profiles that characterize the color imaging systems to generate respective sets of device-independent color values for the color imaging systems,

calculate color conversions by recursively reducing differences between the sets of device-independent color values, and

construct a color map describing a relationship between the color imaging systems using the color conversions and user preferences; and

a memory, configured and arranged to store the color map,

wherein the computer arrangement is further programmed to:

use the color map to transform colors between the color imaging systems in the event the color map was defined based on existing user preferences; and

in the event the color map was not defined based on the existing user preferences, using the color conversion and the existing user preferences to redefine the color map, and applying the redefined color map to transform colors between the color imaging systems.

13 14 15. (Amended) A system [color mapping arrangement], according to claim 14, wherein the computer arrangement is further programmed to use an error function for calculating the color conversions.

13 15 16. (Amended) A system [color mapping arrangement], according to claim 14, wherein the computer arrangement is further programmed to configure at least one of the profiles to account for certain perceptual effects on color appearance.

13 16 17. (Amended) A system [color mapping arrangement], according to claim 14, wherein the computer arrangement is further programmed to construct at least one of the following: a lookup table, and an equation.

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13 18. (Amended) A system [color mapping arrangement], according to claim 14, wherein the computer arrangement is further programmed to
detect respective types of color imaging devices between which a color transformation is to be performed, and
in response to the detected types, select a stored color map.

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19. (Amended) For use in transforming colors between source and destination color imaging systems, a data storage medium storing a computer-executable program that, when executed,
uses forward transformation profiles that characterize the source and destination color imaging systems to generate respective sets of device-independent color values for the source and destination color imaging systems;
calculates color conversions for different combinations of source and destination color imaging systems by recursively reducing differences between the respective sets of device-independent color values;[, and]
constructs [a] color maps [map] describing relationships [a relationship] between the different combinations of source and destination color imaging systems using the color conversions and user preferences;
stores the color maps; and
when a user requests a transformation for a selected combination of the source and destination color imaging systems and selected user preferences:
determines whether one of the color maps corresponds to the selected combination and the selected user preferences,
if so, retrieves the corresponding color map, and
if not, constructs a new color map for the selected combination and the selected user preferences.

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-- 25. The method of claim 1, wherein the user preferences include illuminant and observer conditions.

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26. The method of claim 1, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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27. The method of claim 7, wherein the user preferences include illuminant and observer conditions.

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28. The method of claim 7, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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29. The method of claim 10, wherein the user preferences include illuminant and observer conditions.

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30. The method of claim 10, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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31. The method of claim 11, wherein the user preferences include illuminant and observer conditions.

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32. The method of claim 11, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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33. The method of claim 12, wherein the user preferences include illuminant and observer conditions.

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34. The method of claim ¹¹12, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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35. The system of claim ¹³14, wherein the user preferences include illuminant and observer conditions.

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36. The system of claim ¹³14, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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37. The data storage medium of claim ¹⁸19, wherein the user preferences include illuminant and observer conditions.

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38. The data storage medium of claim ¹⁸19, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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39. A method for transforming color values between source and destination color imaging devices, the system comprising:
 providing forward transformation profiles for a plurality of color imaging devices, each of the forward transformation profiles defining a transformation of device-dependent color values to device-independent color values for the corresponding color imaging device;
 specifying transformations of color values by designating combinations of the color imaging devices as source and destination color imaging devices;
 applying the forward transformation profile for each of the source color imaging devices to produce corresponding source device-independent color values;
 applying the forward transformation profile for each of the destination color imaging devices to produce corresponding destination device-independent color values;

reducing error between the source and destination device-independent color values for selected combinations of source and destination color imaging devices to generate color conversions;

generating device links based on the color conversions, each of the device links defining a transformation of color values for one of the combinations of source and destination color imaging devices;

storing the device links;

when a user requests transformation for a selected combination of the source and destination color imaging systems:

determining whether one of the stored device links corresponds to the selected combination,

if so, applying the corresponding device link to provide the requested transformation, and

if not, constructing a new device link for the selected combination.

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40. The method of claim ³⁷39, further comprising:

constructing the device links based on both the color conversions and user preferences; and

when a user requests a transformation for a selected combination of the source and destination color imaging systems:

accepting selected user preferences;

determining whether one of the device links corresponds to the selected combination and the selected user preferences,

if so, retrieving the corresponding device link, and

if not, constructing a new device link for the selected combination and the selected user preferences.

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41. The method of claim ³⁸40, wherein the user preferences include illuminant and observer conditions.

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42. The method of claim 40, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space.

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43. A data storage medium storing a computer program that, when executed: accesses forward transformation profiles for a plurality of color imaging devices, each of the forward transformation profiles defining a transformation of device-dependent color values to device-independent color values for the corresponding color imaging device;

processes information specifying transformations of color values by designating combinations of the color imaging devices as source and destination color imaging devices;

applies the forward transformation profile for each of the source color imaging devices to produce corresponding source device-independent color values;

applies the forward transformation profile for each of the destination color imaging devices to produce corresponding destination device-independent color values;

reduces error between the source and destination device-independent color values for selected combinations of source and destination color imaging devices to generate color conversions;

generates device links based on the color conversions, each of the device links defining a transformation of color values for one of the combinations of source and destination color imaging devices;

stores the device links;

when a user requests transformation for a selected combination of the source and destination color imaging systems:

determines whether one of the stored device links corresponds to the selected combination,

if so, applies the corresponding device link to provide the requested transformation, and

if not, constructs a new device link for the selected combination.

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44. The data storage medium of claim 43, wherein, when executed, the computer program:

constructs the device links based on both the color conversions and user preferences; and

when a user requests a transformation for a selected combination of the source and destination color imaging systems:

accepts selected user preferences;

determines whether one of the device links corresponds to the selected combination and the selected user preferences,

if so, applies the corresponding device link to provide the requested transformation, and

if not, constructs a new device link for the selected combination and the selected user preferences.

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45. The data storage medium of claim 44, wherein the user preferences include illuminant and observer conditions.

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46. The data storage of claim 44, wherein the user preferences include illuminant conditions, observer conditions, a selected gamut mapping, and a selected device-independent color space. --

REMARKS

In the Office Action, the Examiner rejected claims 1, 3-19, and 22-24 under 35 U.S.C. 103 as being unpatentable over ICC Profile 3.3 ("ICC") in view of Lindbloom, and rejected claims 2, 20, and 21 under 35 U.S.C. 103 as being unpatentable over ICC in view of Lindbloom and Stone et al.

In this Amendment, Applicants have canceled claims 6 and 24, amended claims 1-5 and 7-19, and added new claims 25-46. Accordingly, claims 1-5, 7-23, and 25-46 are

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